REMARKS

In the Office Action, the Examiner rejected claims 1-9, 11 and 14-35 under 35 USC § 102(b); and rejected claims 10, 12 and 13 under 35 USC § 103(a). These objections and rejections are fully traversed below. Initially, it should be noted that only claims 1-29 are pending; hence, the rejection of claims 30-35 is improper.

Claims 1-29 remain pending. Reconsideration of the application is respectfully requested based on the following remarks.

REJECTION OF CLAIMS 1-6, 8, 19-22 AND 25-27 UNDER 35 USC § 102(b)

In the Office Action, the Examiner rejected claims 1-6, 8, 19-22 and 25-27 under 35 USC § 102(b) as being anticipated by Matouk et al., U.S. Patent No. 5,625,684. This rejection is fully traversed below.

Matouk et al. describes a telephone handset that includes an active noise suppression system. The active noise suppression system suppresses environmental noise in the vicinity of the telephone handset. A microphone 36 is used to pick up the caller's voice. A sound sensor 41 (which is directed generally in the opposite direction of the microphone 36) will pick up sounds pertaining to the environment which surround the handset 18. By way of an adapter filter 56 and a summer 52, the environmental noise that is picked up by the microphone 36 is able to be largely suppressed so that a recipient of the call can hear the caller's voice with clarity. Hence, Matouk et al. is not using directional sound processing, but is instead using multiple sound pickup sensors or microphones for the purpose of subtracting out or suppressing environmental noise.

In contrast, claim 1 pertains to a directional sound processing system that utilizes first and second microphones, a noise level estimate circuit, and a directional processing circuit. The noise level estimate circuit produces a noise level estimate from the signals provided by the first or second microphones. Then, the directional processing circuit utilizes the noise level estimate "to activate or deactivate directional processing with respect to the first and second electrical sound signals based on the noise level estimate." As to the directional processing circuit, the Examiner points to col. 3, lines 43-52 of Matouk et al. However, Matouk et al. has nothing to do with controlling activation or deactivation of directional sound processing provided by a directional processing circuit as recited in claim 1. Instead, col. 3, lines 43-52 of Matouk et al. merely describes the situation in which the error in the suppression of noise can

be supplied by a feedback loop 57 back to the adaptive filter 56 "so that an appropriate correction can be made by the adaptive filter 56 to supply a corrected third electrical signal to the summer 52. This procedure continues until sufficient correction has been made to bring the combined signal provided on the link 26 is such so that the level of environmental noise present in the signal received by the recipient is below a desired threshold level." Hence, the use of the feedback loop 57 and the adaptive filter 56 is merely to obtain sufficient noise suppression and thus has nothing to do with activation or deactivation of directional processing provided by a directional processing circuit.

Accordingly, it is submitted that claim 1 is patentably distinct from Matouk et al.

Claim 19 pertains to a method for dynamically controlling directional processing in a multi-microphone sound processing system. As previously noted, Matouk et al. has nothing to do with directional processing; hence, Matouk et al. fails to teach or suggest anything pertaining to dynamic control of directional processing. Accordingly, it is submitted that claim 19 is patentably distinct from Matouk et al.

Claim 22 also pertains to a method for dynamically controlling directional processing in a multi-microphone sound processing system. Again, since Matouk et al. fails to teach or suggest anything pertaining to directional processing, it is submitted that claim 22 is also patentably distinct from Matouk et al.

On page 12 of the Office Action, the Examiner points out that Matouk et al. uses a directional voice sensor. The directional voice sensor picks up human sounds, generally in one direction. Matouk et al., col. 1, lines 54-60. The fact that the voice sensor (e.g., microphone) in Matouk et al. is positioned so that it is directional is inadequate to teach or suggest the invention recited in claim 1. First, Matouk et al. does not perform directional processing with respect to first and second microphones as recited in claim 1, 19 and 22. With direction processing, incoming audio signals from two or more microphones are electronically processed so as to effectively receive incoming audio signals from a particular direction. Accordingly, Matouk et al. does not perform directional processing. Second, as noted above, Matouk et al. also has nothing to do with controlling activation or deactivation of directional processing provided by a directional processing circuit as recited in claim 1 or dynamically controlling directional processing as in claims 19 and 22.

Based on the foregoing, it is submitted that claims 1, 19 and 22 are patentably distinct from Matouk et al. In addition, it is submitted that dependent claims 2-6, 20, 21 and 23-29 are also patentably distinct for at least the same reasons as their

corresponding independent claim. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Matouk et al. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-6, 8, 19-22 and 25-27 under 35 USC § 102(b).

REJECTION OF CLAIMS 1, 5-7, 9, 11 AND 14 UNDER 35 USC § 102(b)

In the Office Action, the Examiner rejected claims 1, 5-7, 9, 11 and 14 under 35 USC § 102(b) as being anticipated by Christensen et al., U.S. Patent No. 4,131,760. This rejection is fully traversed below.

Christensen et al. describes a multiple microphone dereverberation system which reduces multipath reverberative interference. In contrast, claim 1 pertains to a directional sound processing system having at least first and second microphones, a noise level estimate circuit (which produces a noise level estimate) and a directional processing circuit. Among other things, claim 1 recites "said directional processing circuit operates to activate or deactivate directional processing with respect to the first and second electronic sound signals based on the noise level estimate." The Examiner points to the adjustable delay 114, the amplifier 141 and the voltage controlled oscillator 143 shown in Fig. 1 of Christensen et al. as being associated with directional processing. Applicants respectfully disagree. The voltage controlled oscillator 143 is used to provide feedback to the adjustable delay 114 such that the delay provided by the adjustable delay 114 can be varied responsive to the operation of the logic circuit 121 "so that the inputs to the summing circuit 107 may be phase aligned. In this manner the output from the summing circuit 107 provides a signal which has reduced echo and reverberation distortion." Christensen et al., col. 3, lines 52-55. Hence, the components in Christensen et al. identified by the Examiner are used in the context of reducing echo and reverberation distortion, not to activate or deactivate directional processing based on a noise level estimate as is recited in claim 1. Typically, when directional processing is deactivated, the system operates such that it has a single microphone, whereas when the directional processing is activated, multiple microphones are utilized to provide the directional processing. Christensen et al., on the other hand, requires a plurality of microphones 101 and 110 in order to obtain reduced echo and reverberation.

On page 13 of the Office Action the Examiner states:

> Although it is true that Christensen reduces echo and reverberation distortion, Christensen also corrects for signals from different and variable sound directions to reduce echo from different directions. Christensen is therefore a directional processing circuit in order to reduce sound from different directions.

Even if the Examiner is somehow correct that Christensen et al. provides directional processing, there is no teaching or suggestion in Christensen et al. for activation or deactivation of directional processing based on a noise level estimate as is recited in claim 1.

Accordingly, it is submitted that claim 1 is patentably distinct from Christensen et al. In addition, it is submitted that dependent claims 5-7, 9, 11 and 14 are also patentably distinct from Christensen et al. for at least the same reasons. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations concerning claim 1 are clearly sufficient to distinguish the claimed invention from Christensen et al. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1, 5-7, 9, 11 and 14 under 35 USC § 102(b).

REJECTION OF CLAIMS 15-19, 22-24, 28 AND 29 UNDER 35 USC § 102(b)

In the Office Action, the Examiner rejected claims 15-19, 22-24, 28 and 29 under 35 USC § 102(b) as being anticipated by Castello da Costa et al., U.S. Patent No. 5,740,256. This rejection is fully traversed below.

Castello da Costa et al. describes a cross-coupled adaptive noise canceling arrangement that uses an adaptive noise filter and an adaptive cross-talk filter in a feedback loop for canceling correlated noise. By splitting the adaptive cross-talk filter into a pre-filter section and an adaptive filter section, better noise cancellation allegedly results. As shown in Fig. 1, the adaptive noise canceling arrangement 1 can receive sound pick-up from microphones 21 and 22. The signals provided by the microphones are supplied to the adaptive noise canceling arrangement where, not surprisingly, noise is cancelled such that a signal output 4 results that contains less undesirable effects such as reverberation.

As to claim 15, the Examiner points to a pre-filter section 23 of an adaptive cross-talk filter 13 shown in Fig. 1. However, neither the adaptive cross-talk filter 13 nor the pre-filter section 23 thereof produces a minimum estimate for electronic sound signals

provided by a microphone as does the minimum estimate circuit recited in claim 15. Claim 15 also recites a directional processing control circuit that produces a control signal based on the minimum estimate provided by the minimum estimate circuit. As to this claim element, the Examiner points to an adaptive filter section 24 shown in Fig. 1. However, the adaptive filter section 24 merely determines coefficients for the pre-filter section 23. Hence, the adaptive filter section 24 in Castello da Costa et al. does not in any way correspond to the directional processing control circuit recited in claim 15. Still further, claim 15 recites a scaling circuit that scales an electronic sound signal in accordance with the control signal produced by the directional processing control circuit. Here, the Examiner points to an adaptive noise filter 5. The filtering provided by the adaptive noise filter 5 is completely different from scaling an electronic sound signal in accordance with a control signal that is based on a minimum estimate. Hence, for at least these reasons, it is submitted that claim 15 is patentably distinct from Castello da Costa et al.

As to claims 19 and 22, these claims pertain to a method for dynamically controlling directional processing in a multi-microphone sound processing system. In these methods, directional processing is being controlled based on an estimated noise level. As noted above, Castello da Costa et al. teaches nothing about dynamically controlling directional processing. Further, Castello da Costa et al. does not teach or suggest controlling directional processing in accordance with an estimated noise level. The adaptive noise canceling arrangement 1 described in Castello da Costa et al. merely provides noise cancellation, not dynamic control of directional processing. Accordingly, it is submitted that claims 19 and 22 are also patentably distinct from Castello da Costa et al.

On pages 13 and 14 of the Office Action, the Examiner points to col. 5, line 11 which indicates that the pre-filter outputs a desired signal estimate $y_{s,i}$. Such a "desired signal estimate" is not taught or suggested to be a minimum estimate for electronic sound signals provided by a microphone as does the minimum estimate circuit recited in claim 15 or the estimated noise level recited in claim 19 and 22. Further, the Examiner asserts that the signal x_i corresponds to the control signal and that the adaptive noise filter 5 pertains to a scaling circuit as recited in claim 19. As previously noted, the adaptive noise filter 5 is not a scaling circuit as recited in claim 19. Further, according to the Examiner, the signal x_i is an input to the adaptive noise filter 5 which corresponds to the control signal for the scaling circuit of claim 19. However, according to claim 19, the

scaling circuit operates to scale the second electronic sound signal in accordance with the control signal. In contrast, the adaptive noise filter 5 cannot scale in accordance with the signal x_i.

Based on the foregoing, it is submitted that claims 15, 19 and 22 are patentably distinct from Castello da Costa et al. In addition, it is submitted that dependent claims 16-18, 23, 24, 28 and 29 are also patentably distinct for at least the same reasons as their corresponding independent claim. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Castello da Costa et al. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 15-19, 22-24, 28 and 29 under 35 USC § 102(b).

REJECTION OF CLAIMS 10, 12 and 13 UNDER 35 USC § 103(a)

The Examiner also rejected claims 10, 12 and 13 under 35 USC § 103(a) as being unpatentable over Christensen et al. These claims are dependent from claim 1 which, as noted above, is patentably distinct from Christensen et al. Accordingly, for at least the same reasons as claim 1, it is submitted that claims 10, 12 and 13 are patentably distinct from Christensen et al. The additional limitations recited in these dependent claims are not further discussed as the above-discussed limitations concerning claim 1 are clearly sufficient to distinguish these claims from Christensen et al. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 10, 12 and 13 under 35 USC § 103(a).

SUMMARY

It is submitted that claims 1-29 are patentably distinct from Matouk et al., Christensen et al. and Castello da Costa et al., alone or in any combination. Reconsideration of the application and an early notice of allowance are earnestly solicited.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicant hereby petitions for an extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388 (Order No. AUD1P006).

Respectfully submitted,
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